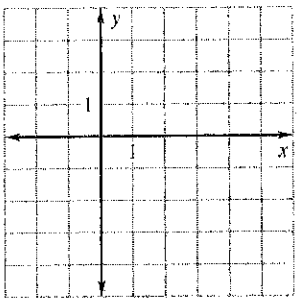
Name _____ Date _____

CHAPTER 9 Chapter Test A

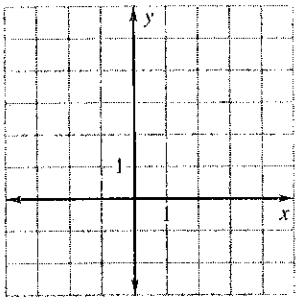
For use after Chapter 9

The vertices of $\triangle ABC$ are $A(-1, 1)$, $B(1, 3)$ and $C(2, -1)$. Graph the image of the triangle using prime notation.

1. $(x, y) \rightarrow (x + 2, y - 3)$

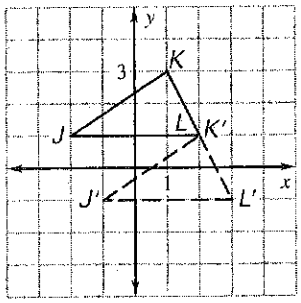


2. $(x, y) \rightarrow (x - 1, y + 1)$

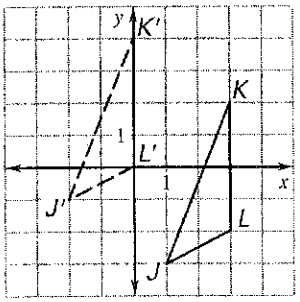


$\triangle J'K'L'$ is the image of $\triangle JKL$ after a translation. Write a rule for the translation.

3.



4.



Add, subtract, or multiply.

5. $\begin{bmatrix} 4 & 1 \end{bmatrix} + \begin{bmatrix} 7 & 5 \end{bmatrix}$

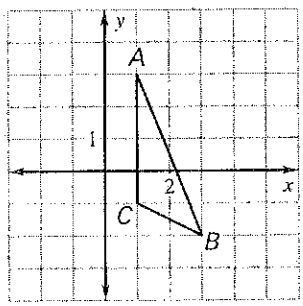
6. $\begin{bmatrix} -3 & 2 \\ 1 & 6 \end{bmatrix} - \begin{bmatrix} 1 & 0 \\ 7 & 4 \end{bmatrix}$

7. $\begin{bmatrix} 3 & -6 \\ 8 & -5 \\ -2 & 1 \end{bmatrix} + \begin{bmatrix} -4 & 5 \\ 10 & 7 \\ -1 & -1 \end{bmatrix}$

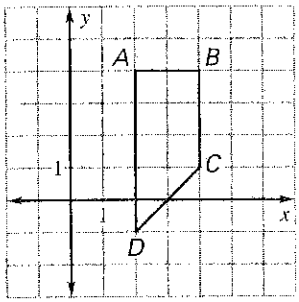
8. $\begin{bmatrix} 8 & 2 \end{bmatrix} \begin{bmatrix} 3 \\ 9 \end{bmatrix}$

Find the image matrix that represents the polygon shown after a reflection in the given line.

9. x-axis



10. $y = x$



Answers

1. See left.
2. See left.
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Name _____ Date _____

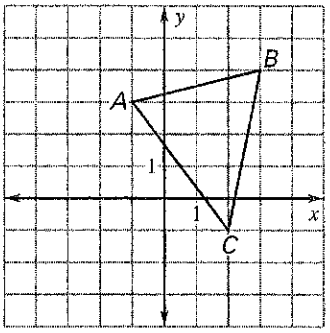
CHAPTER 9

Chapter Test A *continued*

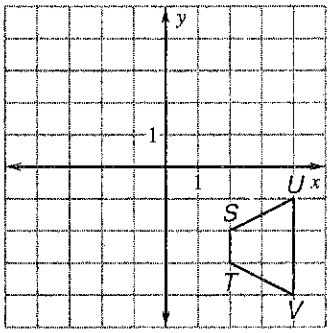
For use after Chapter 9

Rotate each figure the given number of degrees counterclockwise about the origin. List the coordinates of the vertices of the image.

11. 90°



12. 180°



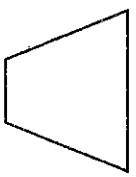
In Exercises 13 and 14, the vertices of $\triangle ABC$ are $A(-4, 4)$, $B(-1, 2)$, and $C(-4, 1)$. Find the vertices of $\triangle A''B''C''$ after a composition of the transformations in the order they are listed.

13. **Translation:** $(x, y) \rightarrow (x + 3, y - 2)$
Translation: $(x, y) \rightarrow (x - 1, y + 4)$

14. **Translation:** $(x, y) \rightarrow (x + 2, y + 1)$
Reflection: in the x-axis

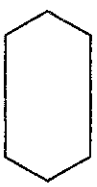
How many lines of symmetry does the figure have?

15.



16.

17.



Simplify the product.

18. $4\begin{bmatrix} 2 & -12 \\ -5 & 16 \end{bmatrix}$

19. $-2\begin{bmatrix} -1 & -7 \\ -3 & 10 \\ 8 & -13 \end{bmatrix}$

The vertices of $\triangle PQR$ are $P(-4, 3)$, $Q(-1, 4)$, and $R(-2, -1)$. Find the vertices of $P''Q''R''$ after a composition of the transformations in the order they are listed.

20. **Translation:** $(x, y) \rightarrow (x + 3, y + 1)$
Dilation: centered at the origin with a scale factor of 2

21. **Dilation:** centered at the origin with a scale factor of 3
Reflection: in the y-axis

Answers

11. _____

_____

12. _____

_____

13. _____

_____

14. _____

_____

15. _____

16. _____

17. _____

18. _____

19. _____

20. _____

_____

21. _____

_____

1. Copy and complete: A(n) ___ is a transformation that preserves lengths.

Match the point with the appropriate name on the vector.

4. T — A. Initial point
5. H — B. Terminal point

EXERCISES

6. The vertices of $\triangle ABC$ are $A(2, 3)$, $B(1, 0)$, and $C(-2, 4)$. Graph the image of $\triangle ABC$ after the translation $(x, y) \rightarrow (x + 3, y - 2)$.

7. The vertices of $\triangle DEF$ are $D(-6, 7)$, $E(-5, 5)$, and $F(-8, 4)$. Graph the image of $\triangle DEF$ after the translation using the vector $\langle -1, 6 \rangle$.

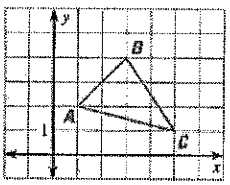
EXERCISES

Find the image matrix that represents the translation of the polygon. Then graph the polygon and its image.

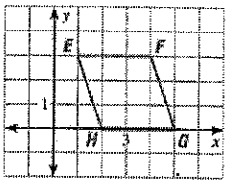
8. $\begin{matrix} A & B & C \end{matrix}$
$\begin{bmatrix} 2 & 8 & 1 \\ 4 & 3 & 2 \end{bmatrix}$;
5 units up and 3 units left

Graph the reflection of the polygon in the given line.

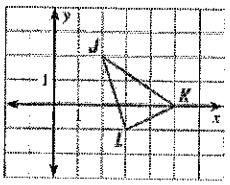
10. $x = 4$



11. $y = 3$



12. $y = x$



EXERCISES

Find the image matrix that represents the given rotation of the polygon about the origin. Then graph the polygon and its image.

14. $\begin{matrix} L & M & N & P \end{matrix}$
$\begin{bmatrix} -1 & 3 & 5 & -2 \\ 6 & 5 & 0 & -3 \end{bmatrix}$; 270°

EXERCISES

Find the image matrix that represents a dilation of the polygon centered at the origin with the given scale factor. Then graph the polygon and its image.

20. $\begin{matrix} Q & R & S \end{matrix}$
$\begin{bmatrix} 2 & 4 & 8 \\ 2 & 4 & 2 \end{bmatrix}$; $k = \frac{1}{4}$

21. $\begin{matrix} L & M & N \end{matrix}$
$\begin{bmatrix} -1 & 1 & 2 \\ -2 & 3 & 4 \end{bmatrix}$; $k = 3$